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# **Preparation of the SNL Lithium Loop**

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Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company,  
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# Pump Testing

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- Vacuum test
  - Done with most Helicoflex gaskets in place,  $10^{-5}$  torr
- Water test of pump
  - Impeller modified for chatter and pumps 10 gal/min into 1" tubing
  - May need new shaft and impeller to get higher head pressure
- Pressure and heating test
  - To be done





## Transfer chamber testing

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- **Heating**
  - Up to 250 °C in 2 hours (No Li)
- **Pressure**
  - To be done
- **Vacuum**
  - To be done





## **The glove box was free, but we added...**

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- **Hoist for 150 lb lid**
- **An extension because tanks were too long**
- **Lights**
- **Argon purge system to control oxygen level**





## Glove box oxygen level

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- Constant purging with Argon
- Oxygen Level for Li
  - Handheld sensor—down to 1%
  - Diethyl zinc or light bulbs—less than 5ppm
  - Trace Oxygen sensor—1% to 1ppm received 4/9/02
- Need to find out what level is necessary and that we can obtain



Before



After 13 hrs  
in glove box

Less than 1% oxygen,  
but greater than 5ppm





# Diagnostics development

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- **Li stream position**
  - Video cameras to be used with magnets
  - Capacitive measurements
- **Level sensing**
  - Inductive level probe on furnace from Hanford
- **Flow measurement**
  - Sonar flow sensor for high temperature





## First Experiments

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- Closed loop Li flow
- Open loop Li flow
  - Need nozzle development
- Flow through magnet
  - No bias current
  - With bias current ( $J \times B$ )
- HHF test Li-cooled refractory tubes
- HHF on open Li flows





## Schedule

Milestone	Projection	Status
Nak Loop Move	Dec 20, 2002	Complete
Magnet design	Jan 15, 2002	Complete
Lithium transfer procedure	Feb 15, 2002	Complete
Vacuum test furnace system	Feb 26, 2002	Complete
Final Operational readiness review for Lithium transfer and flow	April 2, 2002	Complete



## Schedule cont. 2

Milestone	Projection	Status
Magnets purchase	April 4, 2002	Complete
Safety review and report by Lee Cadwallader, INEEL	April 5, 2002	Complete
Glove box gas purity test	April 25, 2002	Need cal gas
Pump modification to get at least 35 psi head and 10 m/s out of nozzle	May 15, 2002	Pump did not meet flow spec and must be remanufactured



## Schedule cont. 3

Milestone	Projection	Status
Pressure test furnace and transfer chamber	May 15, 2002	Can be done while impeller is changed
Final assembly of Pump with LIMITS	May 30, 2002	Depends on pump flow
Lithium transfer to pump chamber	May 30, 2002	Depends on adequate pump flow
Initial Li flow test with bare tube to clean up system	May 30, 2002	See above



## Schedule cont. 4

Milestone	Projection	Status
Magnet yoke	June 19, 2002	Delay was due to 15% hold back in funds
Magnet pole tips	July 2, 2002	Delayed by 15% funds hold back
Tests with Li flow between magnets	July 30, 2002	See above
Installation of EBTS gun on LIMITS chamber	Sept 1, 2002	
High heat flux test on Li	Dec 2002	